PUBLIC PARTICIPATION

Interested persons are to submit written comments on the Decision Document during the public comment period which ends on Friday, November 10, 1989. Written comments related to the Decision Document may be sent to the U.S. Department of Energy, Rocky Flats Office, and must be received no later than November 10, 1989. Written comments may be sent to:

Environmental Restoration Program
U.S. Department of Energy
Rocky Flats Office
P.O. Box 464
Golden, Colorado 80402-0464

Information concerning the proposed IM/IRA will be presented during a public meeting scheduled from 6 to 10 p.m., Thursday, November 9, 1989, at the Front Range Community College, 3645 W. 112 Avenue (between Federal and Sheridan), Westminster, Colorado. The DOE request that any comments to be presented at the public meeting be submitted in writing by Friday, November 3, 1989. The DOE will consider all comments prior to finalizing the Decision Document. The Decision Document is available at the following locations.

Rocky Flats Reading Room
Building 060
Rocky Flats Plant
Golden, Colorado

U.S. EPA
Library, Suite 215
999 18th Street
Denver, Colorado

Front Range Community College
Library
3645 W. 112th Ave.
Westminster, Colorado

Colorado Department of Health
Room 351
4210 E. 11th Ave.
Denver, Colorado

RF Environmental Monitoring Council
Denver West Office Park
1536 Cole Blvd., Suite 150
Golden, Colorado

SITE HISTORY AND BACKGROUND

The Rocky Flats Plant (RFP) is located in northern Jefferson County, Colorado, approximately 16 miles northwest of downtown Denver (Figure 1). The Plant site consists of approximately 6,550 acres of federally owned land in Sections 1 through 4, and 9 through 15, of T2S, R70W, 6th principal meridian. Major buildings are located within an area of approximately 400 acres, known as RFP security area. The security area is surrounded by a buffer zone of approximately 6,150 acres.

FACT SHEET

U.S. DEPARTMENT OF ENERGY
ROCKY FLATS PLANT
GODEN, COLORADO

PROPOSED INTERIM MEASURES/
INTERIM REMEDIAL ACTION PLAN
AND DECISION DOCUMENT
881 HILLSIDE AREA

OCTOBER, 1989

INTRODUCTION

The Department of Energy (DOE) wishes to pursue an Interim Measure/Interim Remedial Action (IM/IRA) at the High Priority Sites (881 Hillside Area) at the Rocky Flats Plant (RFP). This interim action is to be conducted to minimize the release of hazardous substances from this Area that pose a potential long-term threat to the public health and environment pursuant to the Resource Conservation and Recovery Act of 1976 (RCRA) as awarded by the Hazardous and Solid Waste Amendments of 1984 (HSWA); and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) as amended by the Superfund Amendments and Reauthorization Act (SARA). Due to the presence of the two identified ground water plumes and their proximity and potential affect on the water quality of Woman Creek, DOE would like to implement this IM/IRA Plan because of the length of time it typically takes to finalize the RCRA Facility Investigation/Remedial Investigation (RFI/RI), and Corrective Measures Study/Feasibility Study (CMS/FS).

The purpose of this fact sheet is to explain the IM/IRA proposed for the Area, the nature of contamination, and the remedial alternatives that were evaluated. This fact sheet presents only a synopsis of the information on the IM/IRA. Full information is presented in the document entitled "Proposed Interim Measures/Interim Remedial Action Plan and Decision Document, 881 Hillside Area, High Priority Sites", dated October, 1989.

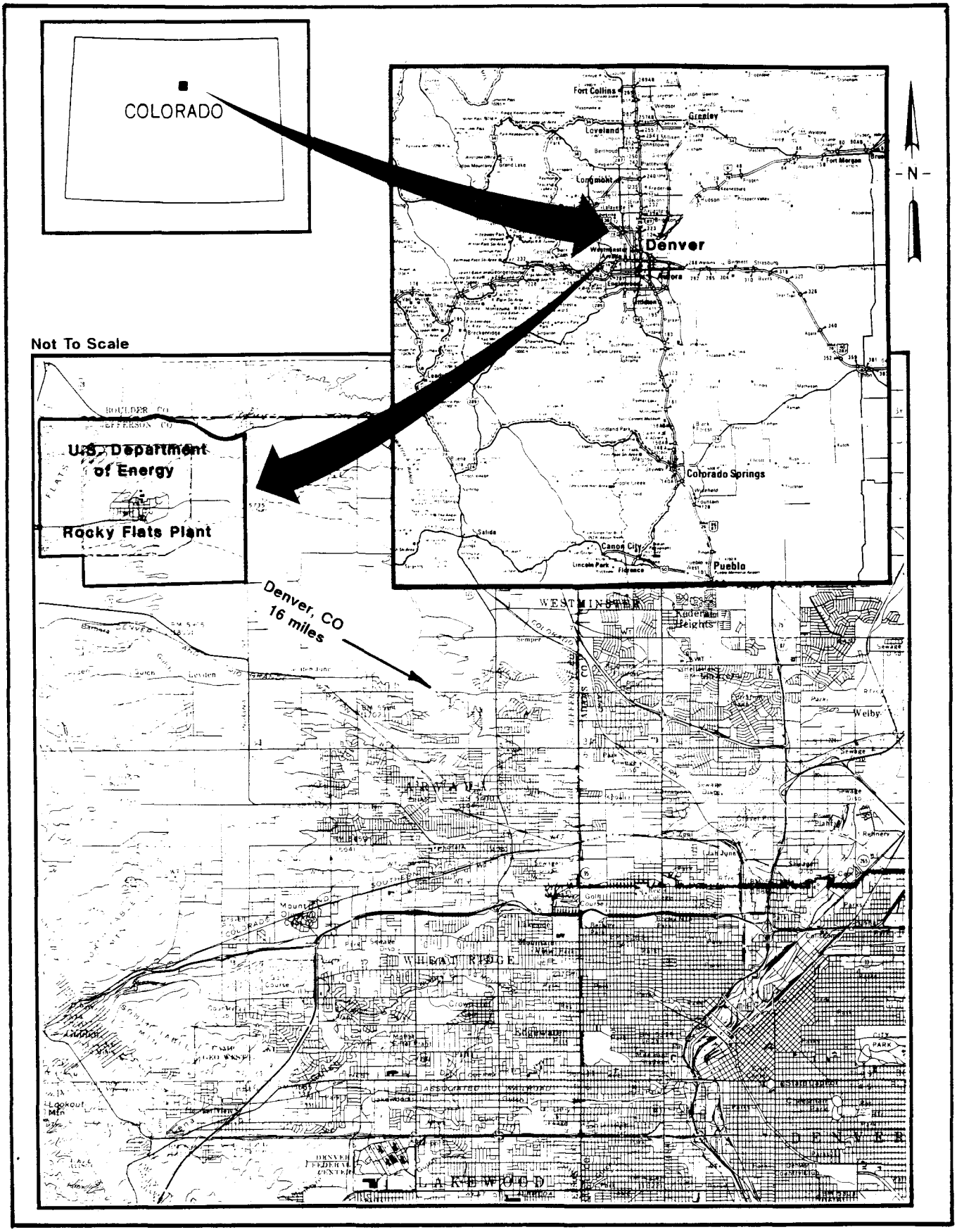

FIGURE 1 - LOCATION OF ROCKY FLATS PLANT

The RFP is a government-owned, contractor-operated (GOCO) facility. It is part of a nation-wide nuclear weapons research, development, and production complex administered by the Albuquerque Operations Office of the U.S. Department of Energy. The operating contractor for the Rocky Flats Plant is Rockwell International. The facility manufactures components for nuclear weapons and has been in operation since 1951. RFP fabricates components from plutonium, uranium, beryllium, and stainless steel. Production activities include metal fabrication, machining, and assembly. Both radioactive and nonradioactive wastes are generated in the process. Current waste handling practices involve on-site and off-site recycling of hazardous materials and off-site disposal of solid radioactive materials at other DOE facilities.

There are twelve sites, designated as solid waste management units (SWMUs), which comprise the 881 Hillside Area. These sites are a result of historical waste management practices. They were investigated as high priority sites because of elevated concentrations of volatile organic compounds in the ground water and the proximity of the sites to a surface drainage. The 881 Hillside Area is located at the southeast corner of RFP (Figure 2). A brief description of each site in the 881 Hillside Area is presented below.

1. **Oil Sludge Pit (SWMU 102)** -- A small pond located south of Building 881 was used for disposal of oil sludges in the late 1950s.

2. **Chemical Burial Site (SWMU 103)** -- A small pit was used for disposal of liquid wastes southeast of Building 881 in the early 1960s.

3. **Liquid Dumping (SWMU 104)** -- An area east of Building 881 was reportedly used for disposal of unknown liquids prior to 1969. This was not substantiated by results of drilling the area in 1987. Therefore, this site may not exist and its location is not shown on the map.

4,5. **No. 6 Fuel Oil Tanks (SWMUs 105.1 & 105.2)** -- Two fuel oil tanks are located south of Building 881; they are out of service and filled with concrete.

6. **Outfall Site (SWMU 106)** -- An overflow line from the sanitary sewer sump south of Building 881 daylights on the slope below the Building.

7. **Hillside Oil Leak (SWMU 107)** -- Oil was discovered flowing from the Building 881 footing drain in early 1973. The source of the oil was never positively identified but the oil was collected in a skimming pond and transported off site. There is an ongoing discharge of water from the footing drain.

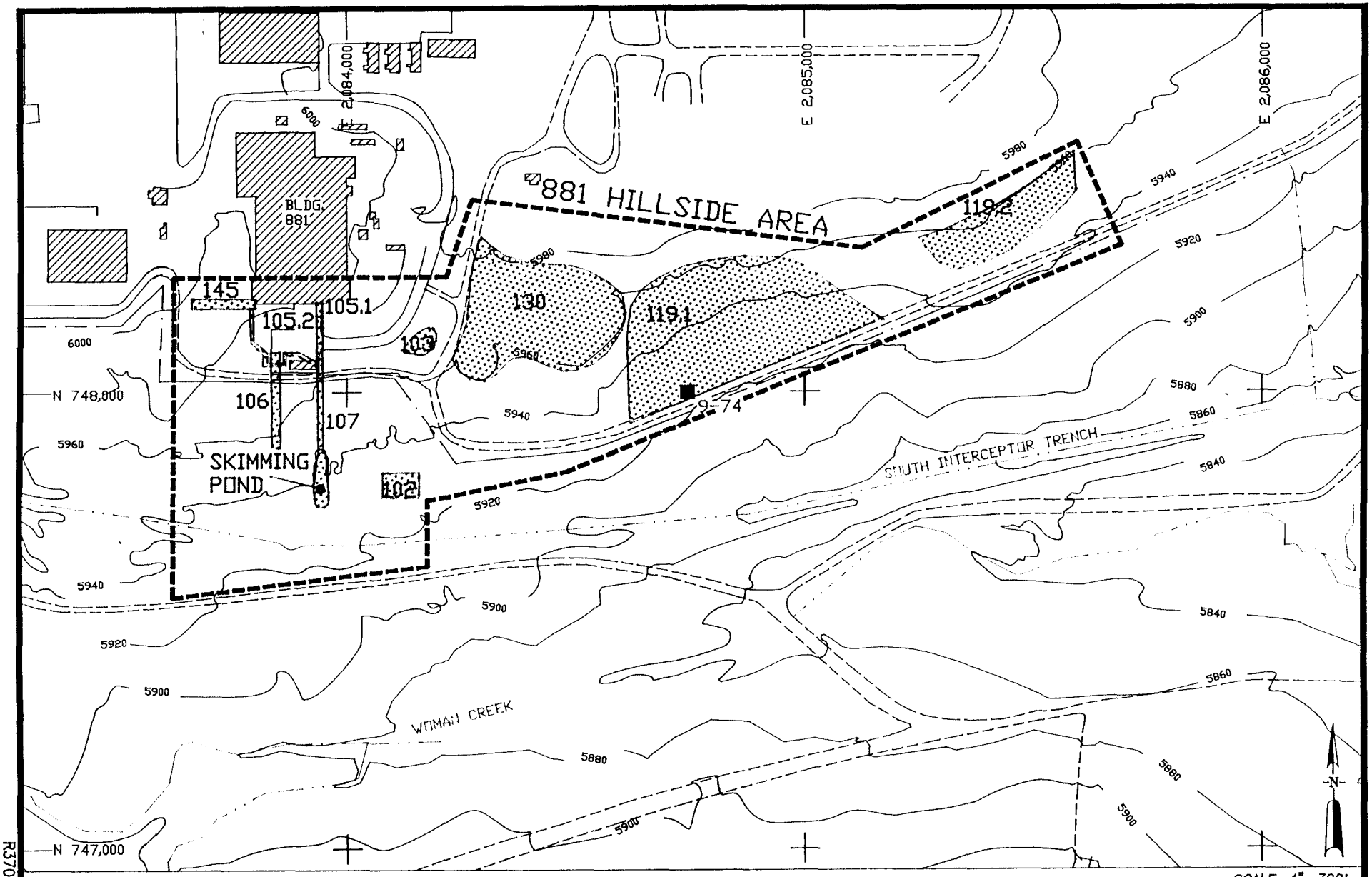

FIGURE 2 -

881 HILLSIDE AREA SITE MAP

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8,9. **Multiple Solvent Spills (SWMUs 119.1 & 119.2)** -- Two areas east of Building 881 were used for barrel storage between 1969 and 1972.

10. **Radioactive Site (SWMU 130)** -- Soils contaminated with low levels of radionuclides were placed on the hillside east of Building 881 and covered with soil between 1969 and 1972.

11. **Sanitary Sewer Line Leak (SWMU 145)** -- The sanitary sewer line leaked on the hillside southwest of Building 881 in early 1981.

12. **Drum Storage Area (SWMU 177)** -- Building 885 is currently used for satellite collection and 90-day accumulation of RCRA-regulated wastes. The building will be closed and soil remediation addressed under RCRA Interim Status (6 CCR 1007-3). Ground-water contamination will be addressed as part of the 881 Hillside Area RI/FS performed under CERCLA.

SUMMARY OF CONTAMINATION PROBLEMS

Alluvial ground water is contaminated with various volatile organic compounds (VOCs) and possibly various metals, major ions, and uranium. Alluvial ground water at the 881 Hillside Area has been divided into three groups on the basis of contaminant migration pathway or nature of the contamination as follows:

1) The Building 881 footing drain discharge (SWMU 107), i.e., alluvial ground water discharging to a surface water pathway.

2) Alluvial ground water beneath or in the immediate vicinity of the 881 Hillside Area characterized by the presence of VOCs in many of the wells.

3) Alluvial ground water downgradient of the 881 Hillside Area beyond the limits of VOC contamination.

The footing drain discharge is characterized by low concentrations of VOCs, and above estimated background concentrations of a few metals, major ions, and uranium. The average concentrations for specific volatile organics exceed Applicable or Relevant and Appropriate Requirements (ARARs) for trichloroethene (TCE) and tetrachloroethene (PCE).

Alluvial ground water at the 881 Hillside Area is characterized by significant VOC contamination. High concentrations of VOCs are notably present in the vicinity of SWMU 119.1 at well 9-74. The maximum concentration for most of the metals exceed estimated alluvial ground-water background concentrations and ARARs. However, only the ARARs for manganese and selenium are exceeded for the average concentrations. Total dissolved solids, chloride,

nitrate-nitrite, and sulfate have average values that exceed the ARAR guidelines. Average total and dissolved uranium concentrations exceed background, but not ARAR.

Downgradient of the 881 Hillside Area, the alluvial ground-water chemistry is characterized by the absence of VOC contamination, with the exception of low concentrations of methylene chloride, acetone, and 1,1-dichloroethene. The methylene chloride and acetone are suspected laboratory contaminants because of their presence in associated laboratory blanks, and the 1,1-dichloroethene was detected only once, in July 1987, at a level (6 ug/l) just above the detection limit of 5 ug/l. Since that time, this compound has not been detected in any well downgradient of the 881 Hillside Area. It is, therefore, considered to be lab or field sampling contamination. Average concentrations of several metals, major ions, and uranium are above the estimated background for alluvial ground water. Concentrations of these inorganic constituents are somewhat lower than at the 881 Hillside Area, and nitrate, chloride, and sulfate do not exceed ARAR on the average. Inorganic constituents have apparently migrated from the 881 Hillside Area, but organic contaminants have not migrated to any appreciable extent.

There is no immediate threat to the public health and environment posed by ground-water contaminants at the 881 Hillside Area because the affected water is contained within the plant boundary. However, an unacceptable risk would be posed to the public by consumption of the contaminated alluvial ground water at or immediately downgradient of the 881 Hillside Area. Although consumption of this water is not likely, an IRA will be implemented in order to prevent further contaminant migration from the 881 Hillside Area that could otherwise exacerbate final cleanup efforts at the site.

SUMMARY OF IRA ALTERNATIVES CONSIDERED

The following alternatives were evaluated in detail in the Decision Document.

1. Collection of ground water using a french drain and a source well, collection of footing drain flow from SWMU 107, treatment of collected water in a new treatment plant and discharge of the treated water to the South Interceptor Trench downgradient of the 881 Hillside.

2. Total encapsulation of source areas using a multi-layer cap and slurry well with control of gradients by pumping an internal sump (dewatering fluids to be treated at an existing treatment plant).

3. Collection of ground water using a source well, collection of footing drain flow from SWMU 107, treatment of collected water at a new treatment plant, and

discharge of the treated water to the South Interceptor Trench downgradient of the 881 Hillside.

Six water treatment technologies were subjected to a detailed evaluation to determine the most cost-effective, reliable treatment system for inclusion with the above alternatives requiring water treatment. These technologies were UV peroxide oxidation, carbon adsorption, and air stripping for organic contaminant removal, and ion exchange, reverse osmosis, and electrodialysis for inorganic contaminant removal.

It was determined that all three organic treamtnent processes will effectively decontaminate the ground-water; however, the ultimate destruction of ground-water contaminants has become a factor in the choice of treatment. The air stripping and activated carbon adsorption systems both use activated carbon, and with regeneration, the contaminants that have adsorbed onto the carbon would eventually be destroyed. However, this assumes that the carbon is not radioactively contaminated, thereby requiring shipment to the Nevada Test Site for disposal. Uranium, either naturally occurring or resulting from past waste disposal, will likely adsorb to the activated carbon but would pass through the UV/peroxide system. Although use of an ion exchange unit before activated carbon treatment would obviate this issue, adsorption of organics on the exchange resin would reduce resin performance and render this treatment scheme inefficient. SARA favors innovative treatment technologies that destroy contaminants, and UV/peroxide meets thisobjective. Therefore, the advantage provided by a UV/peroxide system of directly destroying the volatile organic ground-water contaminants is the deciding factor in selecting UV/peroxide as the preferred process for ground-water treatment.

The electrodialysis and reverse osmosis processes are both membrane processes which require a high degree of process control for effective operation. The membranes are very sensitive to fouling, and proper pretreatment is needed to ensure steady performance over time. The ion exchange process utilizes resin beds in place of membranes and is considered more reliable for long term operation. Thus, the ion exchange system has been selected as the preferred water treatment technology for removal of inorganic contaminants.

As summarized above, the UV/peroxide treatment system has been selected for the removal of organic contaminants, and ion exchange for the removal of inorganic contaminants. In order to maximize the overall system performance, the ground water will be treated as shown in the flow diagram in Figure 3.

As shown in this figure, the ground water will be pumped into two surge tanks. The surge tanks insure that the treatment system will receive a constant flow of 30 GPM, 8 hours per day. These tanks also provide approximately two days of collection potential when the treatment system is not operating. From the surge tanks, the

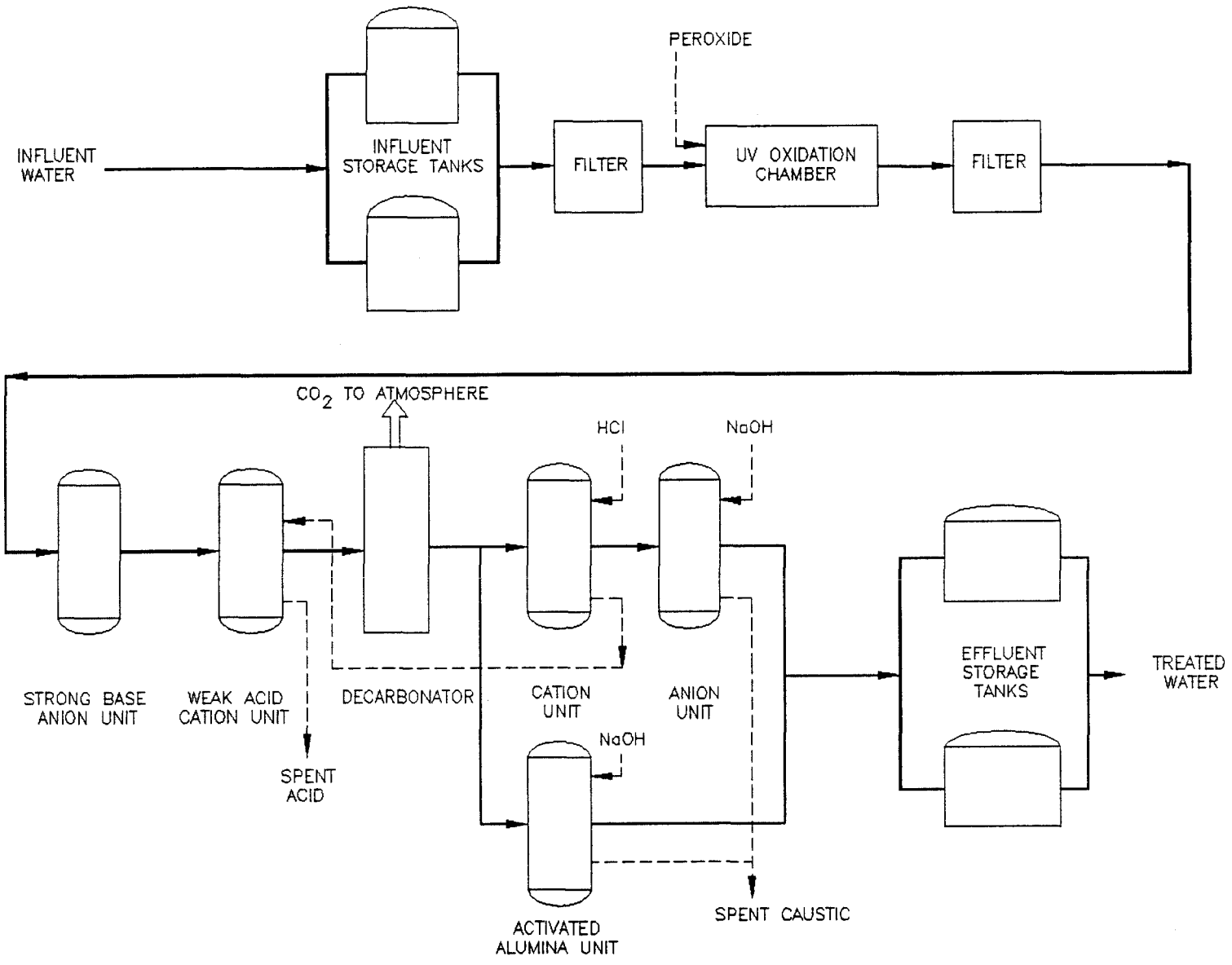

FIGURE 3 - - TREATMENT SYSTEM PROCESS FLOW DIAGRAM

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water is pumped through filters to remove suspended solids. The water next is sent to the UV/peroxide unit where the volatile organic contaminants are destroyed. Finally, the water is passed through the ion exchange units for the removal of uranium and inorganic contaminants. With the exception of the uranium removal unit which is not regenerated, the regenerate wastes from the other ion exchange resins are sent to Building 374 for final treatment. Treated water is pumped to the effluent storage tanks for analysis prior to discharge. Should the effluent quality be unacceptable for discharge, the water will be returned to the influent storage tanks for further treatment.

With respect to the remedial alternatives evaluated, Alternative 1 is the most extensive interim action considered and will result in effective collection of the contaminated 881 Hillside Area ground water. The french drain will halt all contaminant releases to the alluvial ground water downgradient of the 881 Hillside Area. Collection of the Building 881 footing drain flow and pumping of a new well at SWMU 119.1 will result in collection of any contaminated water from these areas. The ground-water treatment system will effectively remove both the organic and inorganic contaminants in the ground water to below the chemical-specific ARARs. Discharge of the treated water into the South Interceptor Trench allows for the water to be combined with Pond C-2 water before final discharge off-site in accordance with Rocky Flats Plant NPDES Permit.

Total encapsulation (Alternative 2) will not destroy the contaminants present, but will contain them in place. It will prevent all future contaminant releases from the SWMUs but will allow a small quantity of ground water with concentrations of VOCs in the range of 5 to 150 ug/l to be released. The portion of this water that is not consumed by evapotranspiration will ultimately reach the Woman Creek Valley Fill Alluvium and flow east toward the property boundary. It is unlikely that volatile organics will ever be detected at the boundary from this release. This alternative uses proven technology intended for much higher contamination levels than are present on the 881 Hillside. However, public reception of this may be unfavorable due to the contaminant releases to the Valley Fill Alluvium.

Collection of the footing drain flow and pumping of a new well at SWMU 119.1 with treatment of collected water (Alternative 3) is a limited-scope response that should make a significant impact on releases from the two SWMUs. However, this alternative may not result in complete capture of the contaminated ground water as Alternative 1 does with the french drain. Although volatiles currently are not detectable in the surface waters receiving flow from the footing drain, collection and treatment of the footing drain flow will provide an extra level of assurance that significant releases will not occur in the future. Pumping the well completed in the center of SWMU 119.1 will clearly improve conditions by removing the most contaminated ground water. As with Alternative 1, the ground-water treatment system will effectively

remove both the organic and inorganic contaminants to below the chemical-specific ARARs.

Alternative 1 has been chosen as the proposed interim remedial action. This alternative involves construction of a french drain (trench) to intercept all contaminated alluvial/colluvial ground water from the 881 Hillside Area. The drain will be located downgradient of the 881 Hillside SWMUs, will be keyed into bedrock in order to fully penetrate the soils and will be 2,100 feet long. The alternative is portrayed in Figure 4.

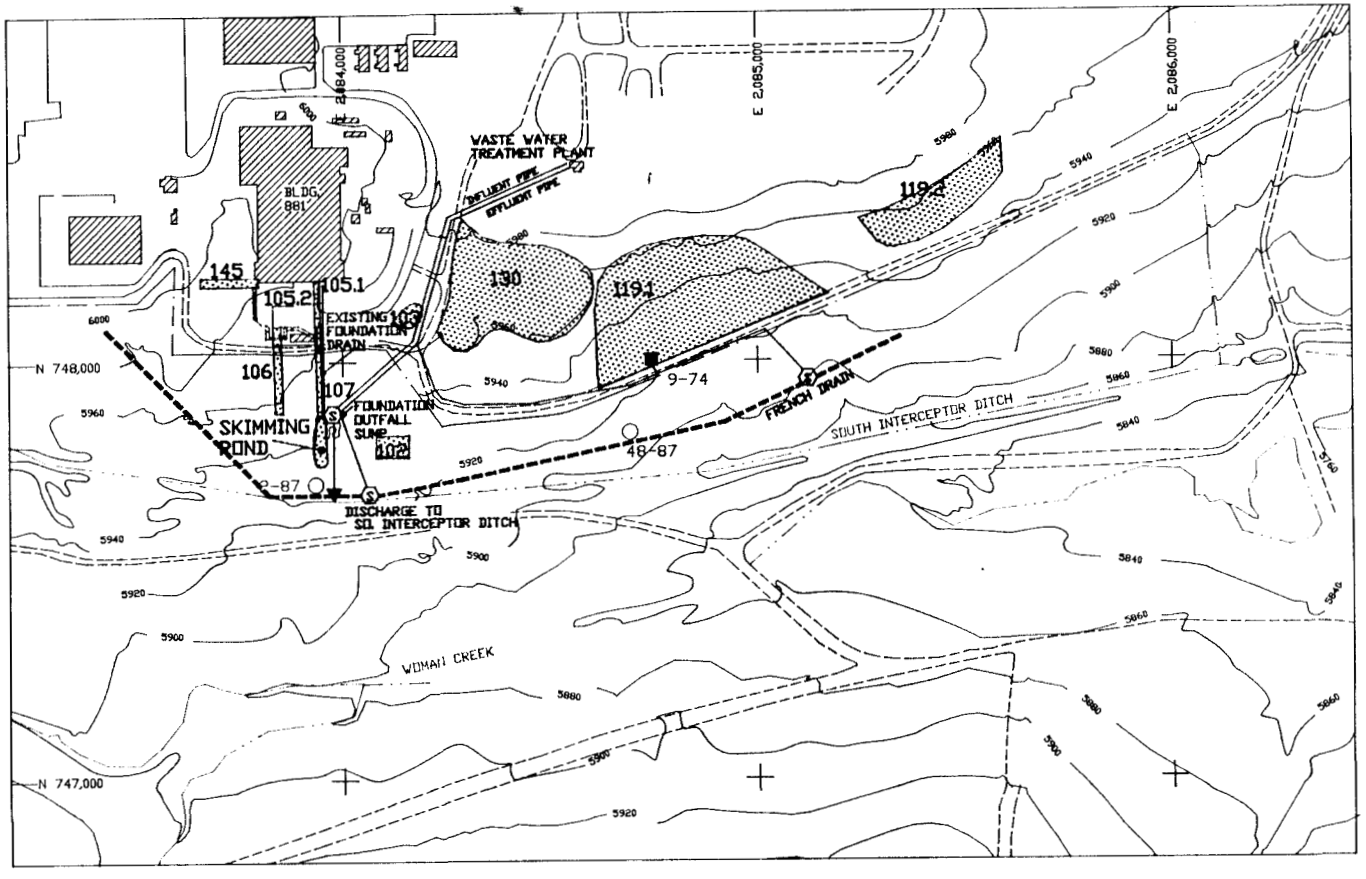
A PVC drainage pipe inside the drain will direct flow under gravity to two 3-foot diameter collection sumps. Each sump will be equipped with a submersible sump pump to deliver the water from the drain to the new treatment plant. The downstream face of the french drain will be covered with a synthetic membrane to limit flow from the clean side of the drain. The inclusion of the downstream synthetic membrane coupled with the continuity of the drain will provide positive cutoff of the ground water verified by monitoring 5 ground-water monitoring wells to be installed along the drain and downgradient.

Water collected from a source well at SWMU 119.1 (a new withdrawal well near well 9-74) will also be treated in the new treatment plant. In addition, a sump will be built to collect the flow from the Building 881 footing drain. Two sump pumps will be used to transfer the footing drain flow to the treatment plant in a separate piping system.

The ground water collected will be treated using a UV peroxide system (for organics removal) and an ion exchange system (for inorganics removal). A new building will be erected for enclosure of the water treatment system to protect weather or temperature sensitive components. External water pipes will be buried approximately four feet to protect against freezing.

Following treatment, the water will be directed to an effluent storage tank prior to discharge to the South Interceptor Trench. During start-up of the treatment unit, all effluent will be analyzed prior to discharge. Effluent of unacceptable quality will be returned to the influent storage tanks for additional treatment. After the effectiveness of the treatment system is proven, the frequency of effluent monitoring at the treatment plant will be reduced to a technically-based level.

Water discharged from the treatment system will pass through Pond C-2 and eventually into Woman Creek. This discharge is monitored, according to the Rocky Flats Plant NPDES Permit which was modified on 11 July 1989 on a temporary basis by the Colorado Water Quality Control Commission. The modification calls for analysis of organic and inorganic contaminants in ground water at the RFP, which include promulgated in-stream standards for Walnut and Woman Creek.



EXPLANATION

- 102 — SOLID WASTE MANAGEMENT UNITS
- FRENCH DRAIN SYSTEM
- (S) — SUMPS (location to be finalized during detail design)
- 9-74 — RECOVERY WELL
- 48-87 — ALLUVIAL MONITOR WELLS

FIGURE 4 -

ALTERNATIVE 1:
FRENCH DRAIN COLLECTION
WITH TREATMENT

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